SUPPLEMENT ARTICLE

Patients' Interviews and Misuse of Antibiotics

Jean Claude Pechère
Department of Genetics and Microbiology, University of Geneva, Geneva, Switzerland

To better evaluate patient contribution in antibiotic use, we questioned 5379 subjects from 9 countries. Antibiotics are perceived as strong, efficient drugs, but they are believed to undermine immunity. Interviewees believe that most respiratory infections, except the common cold, require antibiotic therapy, and 11% of them had to exaggerate their symptoms to get an antibiotic prescription from their physician. About 1 patient in 4 saved part of the antibiotic course for future use. Sixty-nine percent of the patients claimed to have taken the course until the end (United Kingdom, 90%; Thailand, 53%), and 75% claimed that they actually took all the daily doses. In all countries, it was possible to get antibiotics from a pharmacist without a medical prescription. This study shows that patients exert pressure on their doctors to get antibiotics and should allow a design for precise educational action aimed at the public for better control of antibiotic use in the community.

There is little doubt that the indiscriminate use of antibiotics has contributed to the emergence of bacterial resistance, both in hospitals and community settings [1]. The major force driving changes in the prevalence of resistance in the community seems to be the volume of drug use, and different epidemiological models have been proposed to describe the phenomenon [2, 3]. A more comprehensive strategy for better antibiotic use is essential for preserving, as far as possible, the considerable benefit of antibiotics. In particular, there is a clear need to improve the scientific understanding of the factors associated with antibiotic use. So far, most of the efforts for controlling the use of antibacterial agents have been directed toward the prescribers: guidelines, national and international antibiotic policies, and educational programs. However, little is known about the magnitude of patient contribution in antibiotic use, so no sound strategy has been developed for educating the public.

In this study, we have examined some patients' attitudes toward antibiotics. We questioned them directly, because it has been recognized that at least in the domain of adherence to treatment, physicians may be not good predictors of their patients' views [4, 5]. Through telephone interviews, we tried to learn more about their perceptions of common respiratory tract infections, their requirements for antibiotic use, and their adherence to the treatment as prescribed. A first limited Pan-European study suggested that patients' attitudes varied according to their country of residence [6], so the present survey has been extended to Asia, Africa, and Colombia.

SUBJECTS AND METHODS

Subjects. All subjects were interviewed for 20 minutes by telephone. During the last 12 months, all those questioned had either taken a course of antibiotics or had given one to their child for an ambulatory respiratory tract infection. For ascertaining the diagnosis of respiratory infection, the following words were used in the questions: flu, cold, earache, sore throat, thick catarrh, bad cough. Approximately 600 interviewees were randomly selected from each of the following 9 countries: United Kingdom, France, Belgium, Italy, Spain, Turkey, Thailand, Morocco, and Colombia. Randomization of interviewees was performed by a medical market research company (Millward Brown Market Re-

Reprints or correspondence: Dr. Jean Claude Pechère, Dept. of Genetics and Microbiology, University of Geneva, 1 Michel Servet, 1211 Geneva, Switzerland (pechere@cmu.unige.ch).

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search, Tachbrook Park, Warwick, United Kingdom). The selection was done through random digit dialing, where numbers that conform to the local telephone number structure are generated by computer in a totally random fashion. The targets are then contacted and selected for further interview via a screening process to see if they fit the profile for the research. To prevent any bias, we excluded potential interviewees if they or a close member of the family were involved in any of the following occupations: market research, marketing, advertising, journalism, newspaper production, pharmaceutical industry, health services. In each country, approximately 200 interviewees were drawn from each of 3 demographic groups: working adults, aged 18–54 years; adults over 55 years; and mothers of children aged 0–12 years.

Questionnaires. Identical questionnaires, made up of 21 multiple choice questions, were used in the 9 countries. Questions determined the socioeconomic status of the interviewee as well as the seriousness of the respiratory tract infection for which the antibiotic was prescribed and how the patient or parent viewed the need for medical advice and drug therapy. Interviewees were also questioned about their belief in antibiotic therapy, the way the drugs work and their effects, and their perception of doctors. Interviewees were also asked about their adherence to their most recent course of antibiotics in terms of taking the required number of daily doses and the full duration of the course.

Data analysis. There was no intention to try to establish any statistically significant difference across the 9 countries. It was initially hoped that any difference in attitudes of patients in the different countries would become apparent. To assist in the interpretation of the data, we analyzed patient responses by using correspondence analysis [7].

RESULTS

A total of 5379 subjects (initial target: 5400) were interviewed, including 1798 working adults, 1766 older adults, and 1815 mothers (no overlaps between the 3 groups). The last experienced respiratory infection was perceived as potentially severe by the majority of the interviewees, with large variations according to the group and the country. Thirty-seven percent of adults felt sorry for themselves ("could not go to work, could not sleep, could not eat, needed to have somebody with me in the house, felt emotionally down/gloomy") (Europe, 35%; Turkey, 66%), and 62% of them worried it could turn into something worse (mothers, 82%; Colombian adults, 82%; Colombian mothers, 97%). Sixty-eight percent of the interviewees wanted to see a doctor for this condition (mothers, 89%; Italy, 91%; Colombian mothers, 94%). However, 34% of the mothers (43% in Colombia) thought they were a better judge than their doctor. Twenty percent of the interviewees tried traditional remedies first (older people, 30%), and 32% got something directly from the pharmacist. This included antibiotics in the 9 countries of the survey.

The majority of those questioned believed (but did not necessarily expect) that for most respiratory tract infections antibiotics should be prescribed: sore throat, 72%; fever, 67%; earache, 65% (in the United Kingdom, 90%); thick catarrh, 64%; bad cough, 65%; and flu, 64%; but common cold, only 37%. Eleven percent of those questioned admitted that they had to exaggerate symptoms to get antibiotics from their physician. Overall, antibiotics have a positive public image, even though some negative perceptions were also mentioned (table 1). The fear that antibiotics would destroy red blood cells was expressed in Colombia, but not elsewhere (Colombian mothers, 38%). This opinion might be connected with the fact that chloramphenicol is available and widely used in Colombia.

Twenty-seven percent of interviewees experienced side effects during the last course of antibiotics they received. Older patients complained most of dizziness and headaches, whereas diarrhea and rashes were more common in children.

Forty-one percent of mothers had concerns about their child taking antibiotics, with wide differences from country to country: more concerns in Colombia (75%) and Turkey (64%), less in Thailand (28%) and Spain (14%). A large majority of interviewees believed that doses should be taken at exact intervals as prescribed, including during the night. Almost a quarter of the patients (24%) or mothers saved part of the antibiotic course for future use. Noncompliance behavior was commonly recorded. Only 3 of 4 patients admitted that they took all daily doses (mothers, 78%; older adults, 79%; working adults, 67%). The percentage of patients who claimed to finish the antibiotic course varied from 53% in Thailand to 90% in the United Kingdom (table 2). The reasons for stopping the course prematurely were mostly because the patients felt better (87%). Memory loss, side effects, and bad taste in the mouth were quoted in 5% of cases or less.

Table 1. Overall impressions about antibiotics from 5379 interviewees.

Positive features (% who concurred)	Negative features (% who concurred)
Speed recovery (87)	Undermine natural immunity (59)
Provide effective cure (80)	Had side effects during the last course (27)
Strong drugs (74)	Unpredictable (18)
A savior (51)	Mysterious (18)
Dependable (45)	Aggressive (19)
Gentle (16)	Frightening (11)

Table 2. Percentage of patients who claimed to finish the course of antibiotics, and those who saved part of the course for future use.

Country	Percentage of patients who	
	Claimed to finish the course	Saved part of the course for future use
United Kingdom	90	4
France	82	9
Belgium	82	13
Turkey	70	23
Italy	65	41
Morocco	62	25
Colombia	59	31
Spain	55	36
Thailand	53	20
All	69	24

DISCUSSION

This survey suggests that patients represent a significant source of antibiotic misuse in the community. Most respiratory tract infections were perceived as potentially severe especially in Morocco, Thailand, Turkey, and Colombia, and hence the prescription of an efficient therapy was expected. Some patients had to exaggerate their symptoms to get the prescription. A majority of patients were willing to take antibiotics for conditions likely to have a viral origin, such as flu, sore throat, cough, or earache. Data suggest that patients can exert pressures on doctors for antibiotic prescriptions for common respiratory tract infections. Keeping leftover medication for future use was another source of misuse, because these antibiotics are kept in uncontrolled conditions and potentially used later without a medical prescription. It was possible to get antibiotics directly from the pharmacist without prescription in all 9 countries of the survey, even where this practice is illegal. This gray area of pharmaceutical practice deserves further investigation to know the relative importance of over-the-counter sales. Recently, in Kathmandu, Nepal, it was documented that all 100 pharmaceutical retailers contacted by a mock patient engaged in diagnostic and therapeutic behavior beyond their scope and training or legal mandate. Unnecessary antimicrobial agents were dispensed by 97% and 38% of retailers for diarrhea and dysuria, respectively [8].

Recent studies in European children, also by means of standardized telephone interviews after antibiotic courses for common respiratory infections, gave similar figures on nonadherence attitudes as those presented in table 2: 55.7% in Spain [9] and 69.5% in Germany [10]. However precise evaluation of nonadherence attitudes toward treatment is problematic. Physicians are not good predictors of their patients' compliance [3, 4], and it is very likely that self-reporting substantially underestimates noncompliance. A recent report on compliance with doxycycline therapy for *Chlamydia*-associated syndromes indicated that 90% of the patients reported taking their medication as directed, but only 16% achieved this level of compliance according to the data obtained with medication event monitoring system caps [11]. Noncompliance may have an impact on antibiotic resistance in the community, as illustrated in multiple drug–resistant tuberculosis [12]. With the resistance perspective, we have distinguished 2 types of misbehavior. Type A consists in shorter than prescribed courses. By reducing the antibiotic pressure, provided that the daily doses are otherwise respected, one may see a theoretical advantage vis-à-vis the selection of resistance during therapy. Type B noncompliance reduces the number of daily doses, a behavior commonly combined with type A. Missing 1 dose leads necessarily to lower serum/tissue area under the curve and shorter time of antibiotic concentrations over the MIC during the corresponding nyctohemeral period. Animal studies and at least 1 clinical study indicate that such underdosing may promote the selection of resistance during therapy [13]. If so, type B noncompliance could contribute to the resistance burden in the community.

Patients' attitudes varied according to the country. Spain and Thailand were characterized by low compliance and low percentage of mothers having concerns about their child taking antibiotics, implying that antibiotics are considered as trivial drugs. The British appeared as the most disciplined patients, with high self-reported compliance, drugs taken at exact intervals, and high respect for the physicians, a trait also shared in Belgium and France. Much more emotional attitudes were recorded in Turkey and Colombia: antibiotics are "strong," they undermine immunity, part of a course can be saved for future use, great concerns regarding the children with respiratory infection are expressed, the demand for medical support is high even though many mothers think they are better judges than their doctors. The reasons for these differences are probably multiple, including access to medical care facilities, health insurance system as illustrated in a study conducted in rural China [14], education, and even cultural background.

We conclude this study by highlighting the need to educate patients regarding antibiotic use and the consequences of misuse: what diseases actually require antibiotics, why full daily doses must be respected, absence of significant alterations of immunity associated with antibiotic therapy, danger of keeping part of a course for future uncontrolled use, and need of a prescription for getting antibiotics from the pharmacist could be some of the issues to be discussed with the patients.

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